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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/516,708

12/03/2004

Takuo Funaya

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EXAMINER

STONER, KILEY SHAWN

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

05/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/516,708	Applicant(s) FUNAYA ET AL.	
	Examiner KILEY STONER	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13, 15-36, 41 and 42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-13, 15-36, 41 and 42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-13, 15-20, 33-34 and 41-42 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Blair et al. (U.S. 6,109,506).

When the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention but has basis for shifting the burden of proof to applicant as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP §§ 2112- 2112.02.

Art Unit: 1793

Blair et al. teach a solder comprising zinc at 7 to 10 weight % both inclusive, bismuth at 1 to 6 weight % both inclusive, silver at X weight % wherein X is equal to or greater than 0.025, but smaller than 0.1, and the remainder of tin, said solder being lead-free (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12); said solder is in the form of powder (column 2, line 52). The composition of Blair et al. would intrinsically have the claimed composition when melted. Blair et al. also teach that the solder comprises said silver at 0.025 to .08 weight % both inclusive (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12), and said solder contains said silver at Z weight % ($0.025 \leq Z < 0.1$) (column 2, line 61-column 3, line 10; Tables 1 and 2; and claims 7, 8, 11 and 12).

With respect to claims 11-12 and 17-18, Blair et al. does not teach the diameter of the solder paste particles; however, the examiner take Official Notice that the claimed diameters are well known in the art.

With respect to claims 13, 19 and 20, Blair et al. teach that the solder is mixed with flux, but is silent with respect to the concentration of flux. It is the examiner's position that the amount of flux is a result effective variable that would be readily optimized to obtain an adequate bond. Thus, the claimed concentration of flux would have been obvious to one of ordinary skill in the art.

With respect to claims 41 and 42, the intended use of the solder does not limit the composition. It is the examiner's position that the composition disclosed by Blair et al. is capable of connecting an electronic component to a circuit board.

Claims 9-13, 15-36 and 41-42 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shoji et al. (US 2006/0071051 A1).

When the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention but has basis for shifting the burden of proof to applicant as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP § § 2112- 2112.02. In the instant case it is unclear if the impurity concentration of Ag described by Shoji et al. inherently meets the claim limitations.

Shoji et al. teach an electronic component soldered to a board (paragraph 3) by soldering with a Pb free solder comprising up to 9% Zn, at least 0.05% Bi (paragraphs 13-16) and a combined impurity level of Ag among other elements of less than 1% in a balance of Sn (paragraph 34). Powder diameter is 1 to 20 microns (paragraphs 42 and 43). Solder is mixed with 8-14% flux (paragraph 24). However, the particular concentration of Ag is not disclosed. Even though Shoji et al. teach that the presence of Ag under 1 mass % does not adversely affect the characteristics of the solder metal, it is the examiner's position that one of ordinary skill in the art would be motivated to reduce the level of Ag impurity in order to form a pure solder alloy. A solder alloy with a lower concentration of impurities will more readily wet the materials being bonded. In addition, a high level of impurities could alter the melting temperature of the solder alloy. Thus, it would be desirable to one of ordinary skill in the art to form a solder alloy with a

Art Unit: 1793

concentration of Ag within the claimed range of 0.025 to 0.1 weight %; 0.025 to 0.08 weight %; and silver at Z weight % ($0.025 \leq Z < 0.1$).

Response to Arguments

Applicant's arguments filed 5/1/09 have been fully considered but they are not persuasive. The applicant argues that the composition disclosed by Blair cannot be used for soldering electronic components and the circuit substrate. The examiner respectfully disagrees. The intended use of the instantly claimed composition is noted, however, the intended use does not patentably distinguish said claimed composition over the prior art. In addition, one of ordinary skill in the art would have had the knowledge to adjust the composition within the disclosed ranges to arrive at a composition that has a melting point that is capable of solder electronic components without thermal degradation.

The applicant also argues the compatibility of the composition of Blair with soldering fluxes. It should be noted that independent claims 9 and 15 do not require fluxes, so the applicant's argument is not commensurate in scope with the claims. Furthermore, it should be noted that the soldering of electronic components can be achieved without flux (fluxless).

Additionally, the applicant argues that the solder having the presently recited composition has the same melting point as a conventional Pb-eutectic system with Sn content of 37 wt%. The melting temperature of the composition is not being claimed. Thus, the applicant's argument is not commensurate in scope with the claims.

The applicant argues there would be no reason to lower the amount of Ag in Shoji to the presently claimed amount of less than 0.1% by weight, and even if Shoji did provide a reason (which it does not), a person having ordinary skill in the art would not expect the unexpectedly superior results of the presently claimed invention (because Shoji discloses that the Ag does not adversely affect the characteristics of the solder metal). The examiner respectfully disagrees as impurities are known to affect the wetting characteristics of a solder material. Thus, one of ordinary skill in the art would be motivated to reduce the concentration of impurities. Regarding the unexpected results it is the examiner's position that the applicant has failed to produce evidence of unexpected results over the entire claimed range of Ag. In other words, the applicant has not established that the claimed composition is an improvement over the prior art. Additionally, it should be noted that claims 9-13, 15-36 and 41-42 are now rejected under 102/103 and unexpected results cannot be used to overcome an anticipatory rejection.

Lastly, the applicant argues that lowering the concentration of Bi, for example, actually degrades the wettability of the solder material. Therefore, lowering the impurity concentration is not always sufficient to enhance wettability of the solder material. In the instant application Bi is not an impurity and thus there is no direct correlation between the applicant's argument and the teachings of the prior art. The examiner maintains that reducing the concentration of impurities will improve wettability.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is 571-272-1183. The examiner can normally be reached Monday-Thursday (9:30 a.m. to 8:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kiley Stoner/

Primary Examiner, Art Unit 1793